have been successful. The City requests permission for continued use of synthetic dilution water.

November 2003 - Passed
February 2004 - Passed
May 2004 - Passed
August 2004 - Passed
November 2004 - Passed
February 2005 - Failed due to diluent, retested and passed.
May 2005 - Passed
August 2005 - Passed
November 2005 - Passed
February 2006 - Passed
May 2006 - Passed

Response #E.2: We concur that the primary focus of further metals removal should be at the industries that discharge to the collection system. The permit requires an evaluation of whether the current local limits for point source industries are sufficient to achieve the new permit limits and requires the development and implementation of revised local limits if the current limits are not sufficient.

As is discussed in Response #B.5, whole effluent toxicity tests are designed to determine if there is any additive or synergistic toxicity affects of the various pollutants in the effluent, and are not designed to assess the toxicity of individual pollutants. Individual metals criteria are established at a level that will be protective of a range of the most sensitive aquatic species. Whole effluent toxicity tests for Attleboro are conducted with only one species.

While authorization was previously granted for the use of synthetic laboratory water as the diluent for whole effluent toxicity testing, this permit requires that the upstream receiving water sample be collected at a different location and that it be used as the diluent. The new location is upstream of the Attleboro discharge but downstream of the North Attleborough discharge. Previous receiving water samples were collected upstream of the North Attleborough discharge. The change is necessary in order to account for any potential additive toxicity effects of the two discharges. If the use of receiving water as the diluent results in invalid tests, the permit includes an automated procedure for switching to synthetic laboratory water as the diluent.

Comment #E.3: Approximately a year and a half ago, the City and our Consultants, CDM, met with the DEP regarding our concern that total nitrogen limit might be implemented in this proposed permit. We were seeking direction from DEP and EPA at that time as the City began the first months of our plant upgrade. The City tried to obtain firm and long-term limits for phosphorus and nitrogen. The official response to the City was to monitor nitrogen until a TMDL

is completed on the Ten Mile River and then the discharge limits for the WWTP would be established and permitted. In effect, the City would not see a total nitrogen limit in this new permit, which would allow at least 5 more years of monitoring and careful assessment. This mutually agreed to approach provided direction to the City's wastewater budget, facility planning and the ongoing upgrade construction.

Response #E.3: As discussed in Response A.4(b), EPA's position relative to nitrogen limits and planned upgrades for Attleboro was outlined in a June 9, 2003, letter from MassDEP reflecting the position of both EPA and the MassDEP permitting program. In the letter, the City was informed that a nitrogen limit could be included in the reissued permit and that this should be considered in any facilities planning conducted by the City.

Comment #E.4: Throughout the years, the City of Attleboro has strived to meet and has complied with its NPDES limitations set by the DEP/EPA for all parameters. Over the past several years the following procedures have been implemented to our process and operations to achieve compliance. In the early 1980's a primary pH of 9.3 to 9.5 was established and maintained using lime addition at the headworks to enhance copper removal. In addition, three primary clarifiers, as opposed to two, were put into service to increase detention time and remove the copper into the sludge. Also, our first stage clarifiers were brought into service to serve as back up primaries to further remove copper into the sludge. In addition, a depressed pH due to the effect of the metal salts was neutralized by the addition of lime to our aeration system to keep the pH above a 7.0, which kept the copper from going back into solution, and substantially enhanced our copper removal. We also limited our septage pumping to nighttime hours during lower flow periods at a slower pumping rate over a longer duration of time. Following our Phosphorus Optimization Study, several different chemical combinations were tried as an alternate to alum. Ultimately we chose ferric chloride and poly aluminum chloride. This enabled us to meet the present phosphorus limit of 0.2.

Response #E.4: We commend the City on its efforts to comply with existing permit limits. However, it does not preclude the need to ensure that the reissued permit is consistent with Massachusetts standards as well as Rhode Island standards.

Comment #E.5: Under Footnote #10 the boxed area denoting "Chronic Limit C-NOEC" says > 94%. The "Effluent Limitations and Monitoring Requirements" in the draft permit indicates our limit as being > 71%.

Response #E.5: The C-NOEC chronic limit should be 71%. The typographical error in Footnote #10 has been corrected.

Comment #E.6: Fact Sheet - page 4 Section C mentions sulfur dioxide dechlorination. Our new chemical is sodium bisulfate.

Response #E.6: The correction is noted for the record.

Comment #E.7: Cyanide - Fact Sheet page 13, our existing ML is 20 ug/l for cyanide and if below report as zero. Is the new ML of 10 ug/l going to be reported as zero or is the limit that is specified in "Effluent Limitations and Monitoring Requirements" in the draft permit our limit?

Response #E.7: The limits for cyanide are 6.3 ug/l monthly average and 30.8 ug/l daily maximum. Any monitoring result of less then 10 ug/l should be reported as zero.

Comment #E.8: With regard to fecal coliform, favorable TRC data was forwarded to Mr. Brian Pitt to support our request to relax our fecal coliform frequency of sampling from 3 times per week back to once per week. We were told that the data submitted warranted a change in frequency but it would take place at the time of the renewal of our permit. We request to see this changed now.

Response #E.8: The final permit reduces the frequency of fecal coliform monitoring to twice per week. The vast majority of POTW permits in Massachusetts that authorize discharges into fresh water systems that afford little dilution require bacteria monitoring of 2 - 3 times per week. The potential for impacts to human health and downstream shellfish beds warrant more frequent monitoring than once per week to ensure that the limit is being met consistently.

Comment #E.9: Another step taken toward permit compliance included the design and implementation of a dechlorination system to meet lower chlorine residual requirements. Under the ongoing facility upgrade we replaced liquid chlorine gas with liquid sodium hypochlorite and sulfur dioxide was replaced with sodium bisulfite.

Response #E.9: The comments are noted for the record.

Comment #E.10: We take exception to several limits as proposed in the current draft permit. We believe that the basis or derivation of the new limits for total nitrogen is not sufficiently substantiated. Further, if imposed, the facility would be subject to yet another structural modification costing millions of dollars and will cause hardship to the taxpayers and ratepayers of the City of Attleboro.

Response #E.10: It is not clear what specific issues the commenter has with the basis or derivation of the total nitrogen limit other than those submitted by its attorney and its consultants. Please see responses above relative to the basis for the total nitrogen limit.

While structural modifications necessary to meet the total nitrogen limit will not be inexpensive, EPA's compliance schedule will account for affordability concerns to the extent reasonable.

Please see Response F#9 relative to the role of cost considerations in the establishment of water quality-based limits.

Comment #E.11: As demonstrated from the above, the Attleboro Wastewater Treatment Facility has successfully met all of the limits imposed in prior NPDES permits and is committed to meeting all reasonable future limits. However, we feel the total nitrogen limit along with the metals proposed in this draft permit are based on inconclusive information due to the fact that a TMDL has not been performed on the Ten Mile River (or any other rivers mentioned by EPA) nor is there any evidence based on the results of our bioassay's that our effluent has a negative toxic impact on our receiving waters, the Ten Mile River.

Response #E.11: See Response #A.1, A.2, B.1, and E.2, as well as the Fact Sheet discussion on metals criteria.

Comment #E.12: We trust that the proposed permit limits and schedule are negotiable and we request to meet with you to establish mutually acceptable terms. Please contact me to set a meeting date.

Response #E.12: EPA has determined that the proposed limits are necessary to ensure compliance with water quality standards. However, a reasonable compliance schedule for meeting any new limits that cannot be met upon the effective date of the permit will be established and the City will be consulted in establishing that schedule.

The following comments were received on the proposed revision to the draft permit from Doug Wilkins of Anderson & Krieger (with attached comments from John Gall of Camp Dresser and McKee), on behalf of the City of Attleboro, in a letter dated August 30, 2007:

Comment #F.1: In its Fact Sheet accompanying the original draft permit (at p. 8), proposing a limit of 0.2 mg/l phosphorus, EPA stated:

> A monthly average total phosphorus limit of 0.2 mg/l has been established based on the "highest and best" practical treatment as defined by the MAWQS. . . . If MassDEP adopts numeric nutrient criteria, a TMDL is completed, or additional water quality information shows that phosphorus limits are not stringent enough to meet water quality standards, more stringent limits may be imposed.

All of these facts and considerations still apply. MassDEP has not adopted numeric criteria; there is no TMDL; and no additional water quality information

appears in the record. EPA points to nothing that has changed, other than comments from RIDEM, which contained no new data and no new analysis. It would be arbitrary and capricious to change course with no change in circumstances and no data to back up the decision.

This is particularly true in light of the justification given in the new Fact Sheet for the draft Attleboro Permit revision (Fact Sheet). Neither EPA nor the States tolerate the practice of imposing limits upon WWTPs based upon the fact that some downstream waters may be "stressed," without specific inquiry, data and analysis showing the facility's actual contribution (or lack thereof) to an alleged water quality violation, and an assessment of the total load and the Pond's capacity, from which the WWTP's contribution may be allocated. *See Arkansas v. Oklahoma*, 503 U.S. 91 (1992); *Friends & Fishers of the Edgartown Great Pond, Inc. v. Department of Environmental Protection*, 446 Mass. 830, 840-844, (2006); RIDEM Rule 7. The Fact Sheet departs from this practice and offers two rationales that do not meet legal requirements.

CDM's comments further note the presence of several golf courses adjacent to the Turner Reservoir that could significantly impact the phosphorus loading and the fact that Rhode Island has indicated they intend to complete a TMDL for Turner Reservoir in 2012.

Response #F.1: Rhode Island Water Quality Regulations establish numeric criteria of 0.025 mg/L (25 ug/L) for any lake, pond, kettlehole or reservoir. RIDEM's comments on the draft permit argued that EPA had not adequately considered impacts of the Attleboro WPCF discharge on attainment of Rhode Island water quality standards for phosphorus, particularly attainment of numeric criteria for total phosphorus in lakes (see Comment # C.1). RIDEM provided an analysis of total phosphorus concentration at the Massachusetts/Rhode Island state line based on the 0.2 mg/l limit in the original draft. EPA was persuaded by this analysis and, based on RIDEM comments and its own subsequent analysis, concluded that the 0.2 mg/l limit proposed in the original draft permit was not sufficiently stringent to ensure that water quality standards would be met in the downstream Rhode Island lake. EPA's decision to rectify its error and re-notice a draft permit for public comment was not arbitrary and capricious; rather, it flowed logically from the public comment period, the purpose of which is to alert the permit issuer to potential problems with a draft permit and to ensure that the permit issuer has an opportunity to address the problems before the permit becomes final.

In addition, EPA concluded that its earlier decision to rely on the "highest and best" practical treatment requirement in Massachusetts WQS to impose a phosphorus effluent limit of 0.2 mg/l could not be adequately supported based on the record before EPA and would not be sufficiently protective of the Massachusetts portions of the river. Applicable nutrient-related EPA guidance and available peer-reviewed scientific literature indicate that a more stringent water quality-based effluent limitation would be required to control the effects of

eutrophication in the receiving water and ensure compliance with applicable water quality standards.

The commenter's suggestion that EPA imposed the phosphorus effluent limit merely on the grounds that the downstream waters are "stressed" and without reference to the actual impact of the facility's discharge on water quality is incorrect. Consistent with the CWA and implementing NPDES regulations, EPA determined a phosphorus effluent limit was necessary only after concluding that Attleboro's discharge had the reasonable potential to cause or contribute to the demonstrated impairments of the receiving waters. Upon so concluding, EPA imposed a limit that would ensure compliance with Massachusetts water quality standards, as it is obligated by law to do. *See* CWA § 301(b)(1)(C).

In determining the need for the limit, EPA also took into account the applicable water quality standards of the downstream affected state, Rhode Island, again as required by law. *See* CWA § 401(a)(2); 40 C.F.R. §§ 122.4(d), 122.44(d)(1)(vii)(4). *See also, Arkansas v. Oklahoma*, 503 U.S. 91 (1992) (EPA has authority to apply water quality standards of downstream state in issuing permit to point source in upstream state).

As outlined in the Fact Sheet and as described below, phosphorus effluent discharges from the Attleboro facility are contributing to violations of water quality standards in both Massachusetts and Rhode Island.

Cultural Eutrophication

Under undisturbed natural conditions, phosphorus concentrations are very low in most aquatic ecosystems. Excessive nutrient levels can result in increases in algae and other primary producers, which may prevent streams from meeting their designated uses. Typically, elevated levels of nutrients such as phosphorus will cause excessive algal and/or plant growth. Phosphorous and other nutrients (*i.e.*, nitrogen) promote the growth of nuisance levels of algae, such as phytoplankton (free floating algae) and periphyton (attached algae), filamentous algae such as moss and pond scum, and rooted aquatic plants, referred to generally as macrophytes.

Noxious aquatic plant growth degrades aesthetic and recreational uses in a variety of ways. Unsightly algal growth is unappealing to swimmers and other stream users and reduces water clarity. Heavy growths of algae on rocks can make streambeds slippery and difficult or dangerous to walk on. Algae and macrophytes can interfere with angling by fouling fishing lures and equipment. Boat propellers and oars may also get tangled by aquatic vegetation.

Excessive plant growth can also result in a loss of diversity and other changes in the aquatic plant, invertebrate, and fish community structure and habitat.

Through respiration, and the decomposition of dead plant matter, excessive algae and plant growth can reduce in-stream dissolved oxygen concentrations to levels that could negatively impact aquatic life. During the day, primary producers (*e.g.*, algae, plants) provide oxygen to the water as a by-product of photosynthesis. At night, however, when photosynthesis ceases but respiration continues, dissolved oxygen concentrations decline. Furthermore, as primary producers die, they are decomposed by bacteria that consume oxygen, and large populations of decomposers can consume large amounts of dissolved oxygen. Many aquatic insects, fish, and other organisms become stressed and may even die when dissolved oxygen levels drop below a particular threshold level.

Decomposing plant matter also produces unpleasant sights and strong odors, again negatively impacting recreational and aesthetic uses. Nutrient-laden plant detritus can also settle to bottom of a stream bed. In addition to physically altering the benthic environment and aquatic habitat, organic materials in the sediments can become available for future uptake, further perpetuating and potentially intensifying the eutrophic cycle.

Due to the tendency of phosphorus to be retained in the water column and/or transported downstream, EPA nutrient guidance emphasizes that when establishing phosphorus effluent limits, a permit issuer must taken into account downstream impacts of the pollutant. *See, e.g.*, Gold Book at 241; Nutrient Technical Guidance Manual at 3 ("In flowing systems, nutrients may be rapidly transported downstream and the effects of nutrient inputs may be uncoupled from the nutrient source[.]").

See generally, Effects of Eutrophication on Stream Ecosystems, Lei Zheng and Michael J. Paul, PhD (Tetra Tech, Inc.); *A Literature Review for Use in Nutrient Criteria Development for Freshwater Streams and Rivers in Virginia* (Virginia Polytechnic Institute and State University, 2006) at pp. 1-11.

Applicable Water Quality Standards

As a Class B water, the Ten Mile River has been designated by Massachusetts as a habitat for fish, other aquatic life and wildlife and for primary (e.g. swimming) and secondary (e.g. fishing and boating) contact recreation. *See* 314 C.M.R. §§ 4.06 (Table 12) and 4.05(3)(b). Such waters must have consistently good aesthetic value and, where designated, must be suitable as a source of public water supply with appropriate treatment, as well as for irrigation and other agricultural uses. *See* 314 C.M.R. § 4.05(3)(b).

Class B waters must also be free of floating, suspended or settleable solids that are aesthetically objectionable or could impair uses. *Id.* at § 4.05(3)(b)(5). Changes to color or turbidity of the waters that are aesthetically objectionable or use-impairing are also prohibited. *Id.* at § 4.05(3)(b)(6).

Numeric criteria for Class B waters include limits on dissolved oxygen (not less than 5.0 mg/l) and pH (6.5-8.3 s.u. and not more than 0.5 units outside the background range). *Id.* at §§ 4.05(3)(b)(1) and (3).

In addition to criteria specific to Class B waters, Massachusetts imposes minimum narrative criteria applicable to all surface waters, including aesthetics ("free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste or turbidity; or produce undesirable or nuisance species of aquatic life"), bottom pollutants and alterations ("free from pollutants in concentrations or combinations or from alterations that adversely affect the physical or chemical nature of the bottom, interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms."), and nutrients. *See* 314 C.M.R. § 4.05(5)(a),(b) and (c).

Pursuant to C.M.R. § 4.05(5)(c), Massachusetts water quality standards require that "unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses…" Massachusetts standards do not include a numeric criterion for total phosphorus.[16]

Rhode Island has designated the Ten Mile River as a Class B1 water from the Massachusetts border to the Newman Avenue Dam in East Providence, and as a Class B water from the Newman Avenue Dam to the discharge into the Seekonk River.

Rhode Island Class B designated waters are suitable for, *inter alia*, fish and wildlife habitat and for primary and secondary recreational uses. RI Water Quality Regulations, Rule 8(B)(l)(c).

Class B1 waters have the same classifications, except for the notation that although all criteria must be met, primary contact recreational uses may be impacted by pathogens from approved wastewater discharges. Rule 8(B)(l)(d).

The receiving waters are subject to a variety of class-specific criteria, as well as generally applicable minimum criteria. *See* Table 1, Rule 8(D)(3); Rule 8(D)(1) (General Criteria).

With respect to nutrients, Rhode Island water quality standards include the following numeric and narrative criteria:

> "a. Average Total Phosphorus shall not exceed 0.025 mg/l in any lake, pond, kettlehole or reservoir, and average Total P in tributaries at the point where they enter such bodies of water shall not cause exceedance of this

[16] Massachusetts has established site-specific criteria for numerous lakes and ponds pursuant to TMDLs. The criteria range from 0.0051 mg/l to 0.0455mg/l (see 314 C.M.R. 4.06, Table 28).

phosphorus criteria, except as naturally occurs, unless the Director determines, on a site-specific basis, that a different value for phosphorus is necessary to prevent cultural eutrophication.

b. None in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication, nor cause exceedance of the criterion of 10(a) above in a downstream lake, pond, or reservoir. New discharges of wastes containing phosphates will not be permitted into or immediately upstream of lakes or ponds. Phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible."

Rule 8(D)(2)(10). *See also* Rule 8(D)(1)(d) (General Criteria; Nutrients).

Water Quality Standard Violations

As outlined in the Fact Sheet and as demonstrated below, the segment of the Ten Mile River into which Attleboro discharges, as well as waters downstream of the discharge, are currently suffering from severe phosphorus-driven impairment and are clearly violating applicable water quality criteria in both Massachusetts and Rhode Island.

From the North Attleborough treatment plant to the Massachusetts/Rhode Island border, the Ten Mile River is listed on the Massachusetts 303(d) list as impaired for unknown toxicity, metals, nutrients, organic enrichment/low DO, pathogens, and noxious aquatic plants. Central Pond[17] and James V. Turner Reservoir, parts of which are in Massachusetts, are also on the Massachusetts 303(d) list as impaired due to nutrients and noxious aquatic plants (see *Massachusetts 2006 Integrated List of Waters*).

In Rhode Island, the free flowing segment of the river from the Massachusetts/Rhode Island border to the inlet of Turner Reservoir North, excluding Slater Park Pond, is listed for cadmium, copper, and lead, and the free flowing segment from Turner Reservoir South to the Omega Pond Inlet is listed for biodiversity impacts, copper and lead. Turner Reservoir, both north and south of the Newman Avenue Dam, are listed for copper, lead, low DO, and phosphorus. Omega Pond is listed for copper, lead, and phosphorus. *See State of Rhode Island 2006 303(d) List of Impaired Waters.*

The *Massachusetts Ten Mile River Basin 1997 Water Quality Assessment Report* describes the trophic state of both Central Pond and the Turner Reservoir as

[17] Central Pond is called Turner Reservoir North by RIDEM in its 303(d) report. In this document EPA has used the names used by Massachusetts DEP, i.e., the body of water north of Newman Avenue is called Central Pond and the body of water south of Newman Avenue is called the Turner Reservoir

hypereutrophic. The *Massachusetts Ten Mile River Basin 2002 Water Quality Assessment Report* noted that 90 percent of Central Pond was covered in duckweed, and that a very dense subsurface cover of *Elodea sp.* (a type of macrophyte) and filamentous algae were observed. The survey of the James Turner Reservoir noted moderate to dense macrophyte cover, a dense filamentous green algal mat covering 50 percent of the northern portion of the reservoir, and dense duckweed in the cove areas.

In 1999, the U.S Army Corps of Engineers investigated the Turner Reservoir to determine its potential as a recreational area and a back-up water supply for the City of East Providence and found it to be eutrophic. Data collected by the Corps showed elevated levels of phosphorus of 0.16 mg/l at the inflow to the Reservoir and describe large amounts of duckweed in Turner Reservoir and Central Pond, which caused offensive odors when the plant material died and decomposed along the shore. The Corps study also noted that its sampling showed an increase in phosphorus concentration from the inlet to the discharge, and offered the possible explanation that the cause of the increase was "that there is so much phosphorus in the sediments that sediment releases to the overlying water exceed plant uptake. *See Turner Reservoir Study, East Providence Rhode Island* (page 9) and Attachment 4 for pictures from report..

The MassDEP *Ten Mile River Watershed, 2002 Water Quality Assessment Report* includes extensive sampling conducted during the spring and summer of 2002 that documents water quality conditions in the main stem of the river, its significant tributaries and its impoundments. The data show that the phosphorus concentration in the Ten Mile River upstream of the facility exceeds the Gold Book guidance value, the Ecoregion criteria, and the other recommended values (discussed below), during every sampling event. Downstream of the Attleboro discharge, below the confluence with the Sevenmile River, the Ten Mile also consistently exceeds the cited water quality criteria. *See* Attachments 5 and 6

As can be seen in the data, the phosphorus concentration of the Ten Mile River entering Central Pond exceeded 0.1 mg/l on each of the sampling events, and the total phosphorus concentration within the Pond and Reservoir far exceeded the Rhode Island numeric criterion of 0.025 mg/l. The impact of the high phosphorus concentration on water quality can be seen by the supersaturated DO, indicating excessive algal growth, and the extremely high chlorophyll *a* values in both ponds on August 28, 2002.

A severe bloom of Microcystis algae (which is potentially toxic to humans and animals) in September 2007 resulted in RIDEM issuing a temporary advisory on September 13th that people avoid recreational activities in the Ten Mile River, including Turner Reservoir and Omega Pond. The advisory noted, "During a recent sampling event, DEM observed a dense algae bloom turning the waters of Turner Reservoir a bright green color. Laboratory results from tests have found high levels of the naturally occurring algal toxin, Microcystin. These levels,

exceeding 25,000 micrograms per liter, are significantly above the guideline of 40 micrograms per liter from the World Health Organization." The advisory was not lifted until December 19, 2007.

Reasonable Potential to Contribute to Water Quality Standard Violations

In the absence of a numeric criterion for phosphorus, EPA looks to a wide-range of materials, including nationally recommended criteria, supplemented by other relevant materials, such as EPA technical guidance and information published under Section 304(a) of the CWA, peer-reviewed scientific literature and site-specific surveys and data. *See* 40 C.F.R. § 122.44(d)(1)(vi)(B). EPA also relies on 40 C.F.R. § 122.44(d)(1)(vi)(A) when interpreting a state narrative criterion and deriving a limit that will achieve uses. EPA does not afford definitive weight to any one value or source, but rather assesses the total mix of technical, science and policy information available when determining an appropriate and protective limit.

EPA has produced several guidance documents which set forth total ambient phosphorus concentrations that are sufficiently stringent to control cultural eutrophication and other adverse nutrient-related impacts. These guidance documents present protective in-stream phosphorus concentrations based on two different analytical approaches. An effects-based approach provides a threshold value above which adverse effects (*i.e.*, water quality impairments) are likely to occur. It applies empirical observations of a causal variable (*i.e.*, phosphorus) and a response variable (*i.e.*, chlorophyll *a*) associated with designated use impairments.

Alternatively, reference-based values are statistically derived from a comparison within a population of rivers in the same eco-region class. They are a quantitative set of river characteristics (physical, chemical and biological) that represent conditions in waters in that ecoregion that are minimally impacted by human activities (*i.e.*, reference conditions), and thus by definition representative of water without cultural eutrophication. While reference conditions, which reflect minimally disturbed conditions, will meet the requirements necessary to support designated uses, they may also exceed the water quality necessary to support such requirements.

The 1986 Quality Criteria of Water ("Gold Book") follows an effects-based approach. It sets forth maximum threshold concentrations that are designed to prevent or control adverse nutrient-related impacts from occurring. Specifically, the Gold Book recommends in-stream phosphorus concentrations of no greater than 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir. A more recent technical guidance manual, the Nutrient Criteria Technical Guidance Manual: Rivers and Streams (EPA 2000) ("Nutrient Criteria Technical Guidance Manual"), cites to a range of ambient concentrations drawn

from the peer-reviewed scientific literature that are sufficiently stringent to control periphyton and plankton (two types of aquatic plant growth commonly associated with eutrophication). This guidance indicates in-stream phosphorus concentrations between 0.01 mg/l and 0.09 mg/l will be sufficient to control periphyton growth and concentrations between 0.035 mg/l and 0.070 mg/l will be sufficient to control plankton (Table 1 shows the range of literature values cited in the Nutrient Criteria Technical Manual, and Table 2 shows a range of phosphorus criteria established by various states)

Table 1

Nutrient (ug/l) and algal biomass criteria limits recommended to prevent nuisance conditions and water quality degradation in streams based either on nutrient-chlorophyll *a* relationships or preventing risks to stream impairment as indicated.

PERIPHYTON Maximum in mg/m^3

TN	TP	DIN	SRP	Chlorophyll *a*	Impairment Risk	Source
				100 – 200	nuisance growth	Welch et al. 1988, 1989
275 – 650	38 – 90			100 – 200	nuisance growth	Dodds et al. 1997
1500	75			200	eutrophy	Dodds et al. 1998
300	20			150	nuisance growth	Clark Fork River Tri-State Council, MT
	20				*Cladophora* nuisance growth	Chetelat et al. 1999
	10 – 20				*Cladophora* nuisance growth	Stevenson unpubl. data
		430	60		eutrophy	UK Environ. Agency 1988
		100[1]	10[1]	200	nuisance growth	Biggs 2000
		25	3	100	reduced invertebrate diversity	Nordin 1985
			15	100	nuisance growth	Quinn 1991
		1000	10[2]	~ 100	eutrophy	Sosiak pers. comm.

PLANKTON Mean in ug/l

TN	TP	DIN	SRP	Chlorophyll *a*	Impairment Risk	Source
300[3]	42			8	eutrophy	Van Nieuwenhuyse and Jones 1996
	70			15	chlorophyll action level	OAR 2000
250[3]	35			8	eutrophy	OECD 1992 (for lakes)

1 30-day biomass accrual time
2 Total Dissolved P
3 Based on Redfield ratio of 7.2N:1P (Smith et al. 1997)

Source: *Nutrient Criteria Technical Guidance Manual – Rivers and Streams*. EPA-822-B-00-002. U.S.EPA. July, 2000.

Table 2		
Examples of Numeric Criteria and Guidelines for Total Phosphorus in the U.S.		
State and Waters	**Phosphorus Criteria Values**	**Reference**
Arizona River Specific	Annual Mean 0.05 – 0.20 mg/l 90 Percentile: 0.10 – 0.33 mg/l Single Sample Maximum: 0.20 - 1.0 mg/l	AAC R18-11-109
Arkansas All Waters	Maximum limit: 0.100 mg/l (guideline)	2 AAC 2.509
Hawaii Inland Streams	Geometric Mean, not to exceed 0.05 mg/l – Wet Season (Nov.1 – Apr.30) 0.030 mg/l – Dry Season (May 1 – Oct. 31)	HAR 11-54-5.2
Illinois Streams at entrance to reservoir or lake with surface area of 8.1 hectares or more	Maximum limit: 0.05 mg/l	35 IAC 302.205
Nevada* River Specific	Monthly, average: 0.1 mg/l	NAC 445A
New Jersey Streams	Maximum limit: 0.1 mg/l, unless demonstrate TP is not a limiting nutrient and will not render the waters unsuitable for designated uses.	NJAC 7:9B-1.14(c)
New Mexico Perennial reaches of specific waters in Rio Grande, Pecos River, and San Juan River basins	Maximum limit (single sample): 0.1 mg/l	20 NMAC 6.4.109 20 NMAC 6.4.208 20 NMAC 6.4.404 20 NMAC 6.4.407
North Dakota Class I, IA, II and III streams	Maximum limit: 0.1 mg/l (interim guideline limit)	NDAC 33-16-02-09
Oregon Yamhill River and its tributaries	Monthly median: 0.070 mg/l as measured during summer low flow	OAR 340-041-0350
Utah Streams and rivers to protect aquatic life; 3B, 3C waters	Maximum limit: 0.05 mg/l (used as pollution indicator; when exceeded, further investigations are conducted)	UAC R317-2 (Table 2.14.2)
Vermont Upland streams (> 2,500 ft.)	Maximum limit: 0.010 mg/l at low median monthly flow	VWQS 3-01-B2
Washington Spokane River (river mile 34 – 58)	Average euphotic zone: 0.025 mg/l (during June 1 to October 1)	WAC 173-201A-130
* Different requirements may exist to maintain existing higher quality streams.		

Source: *A Literature Review for use in Nutrient Criteria Development for Freshwater Streams and Rivers in Virginia.* Virginia Polytechnic Institute and State University – Virginia Water Resources Research Center. 2006.

Based on these materials, EPA determined that an ambient phosphorus concentration of 0.1 mg/l would be necessary to control the effects of cultural eutrophication and to ensure compliance with applicable narrative and numeric nutrient criteria in both Massachusetts and Rhode Island.

EPA has concluded that the available data clearly shows that the discharge of total phosphorus from the Attleboro treatment plant has the reasonable potential to cause or contribute to exceedances of Massachusetts and Rhode Island narrative water quality standards.

At its current total phosphorus limit of 1 mg/l and its design flow of 8.6 MGD (13.3 cfs), the Attleboro discharge would, under 7Q10 conditions with an estimated dilution factor of 1.4, cause an in-stream concentration immediately downstream, of 0.7 mg/l (1/1.4), which far exceeds any recommended water quality criterion. This value assumes a background concentration of zero, meaning that the Attleboro discharge on its own would cause this in-stream concentration in the absence of any other sources. At an effluent limit of 0.2 mg/l, the limit proposed in the original draft permit, the treatment plant would result in a downstream phosphorus concentration of about 0.14 mg/l (0.2/1.4), again assuming 7Q10 conditions and zero background of phosphorus. Thus, even when zero background is assumed, which does not reflect actual in-stream conditions, this value also far exceeds any of the recommended criteria.

Regarding the contribution of phosphorus from golf courses to the observed eutrophication of Turner Reservoir, EPA cannot quantify such contributions based on available data. However, given that the primary contribution from the golf courses would be in the form of stormwater runoff, EPA would not expect a significant contribution during dry weather.

The commenter also suggests that a TMDL (analysis of total load, assimilative capacity of Turner Reservoir, and point source allocations) must be completed before the limit can be imposed. The commenter is mistaken. Although TMDLs must eventually be prepared for section 303(d) listed waters, a completed TMDL is not required in order for EPA to establish water quality-based limits. As required by 40 C.F.R. § 122.44(d)(1), reissued permits must include limits necessary to ensure compliance with water quality standards, including narrative criteria. EPA has an obligation under the Clean Water Act to establish permit limits necessary to meet water quality standards and is required to use available information to establish water quality limits when issuing a permit for a discharge which is shown to have a reasonable potential to cause or contribute to a violation of state water quality standards. *See* 40 C.F.R. § 122.44(d)(1)(i). Where a TMDL has been established, EPA is required to ensure that the effluent limits are "consistent with the assumptions and requirements of any available waste load allocation" applicable to the discharger. 40 C.F.R. §122.44 (d)(1)(vii)(B). Where

a TMDL does not exist, EPA cannot fail to include effluent limits necessary to achieve water quality standards and protect existing and designated uses of the receiving water using the best information reasonably available to it. In this case, it is clearly reasonable to proceed with imposition of the phosphorus limit given the level of existing impairment due to phosphorus-driven cultural eutrophication and given that the facility contributes a substantial amount of the phosphorus loading to the river.

Friends & Fishers of the Edgartown Great Pond, Inc. v. Department of Environmental Protection, 446 Mass. 830 (2006) involved the appeal of a permit for an increased groundwater discharge that had been issued pursuant to the Massachusetts Clean Waters Act and the state's ground water discharge regulations. MassDEP concluded that the permit's nitrogen limitation would ensure compliance with applicable state water quality regulations, and that the permit could therefore issue, based on a study which assessed Edgartown Great Pond's assimilative loading capacity for nitrogen. The court in *Friends and Fishers* merely held that it was reasonable for MassDEP to interpret its regulations to allow issuance of a permit for a groundwater discharge impacting a stressed water body by allocating a portion of the Pond's site-specific nitrogen limitation to the treatment plant based on the loading study. The import of the study was that it allowed MassDEP to conclude that its groundwater discharge permit *was stringent enough* to ensure compliance with water quality regulations. The commenter wrongly suggests that, in the absence of an allocation study of the type in *Friends and Fishers*, it would be impermissible for EPA to include a nitrogen limit in a permit for discharges to nitrogen-impaired waters even if EPA concluded that nitrogen reductions were necessary to ensure compliance with water quality standards. This misreading turns *Friends and Fishers* on its head. In any event, this state case does not establish any requirement, standard or procedure for apportioning pollutant loads that would be applicable (or relevant) to EPA when it issues a federal NPDES permit under the Clean Water Act for the surface water discharge at issue here.

Comment #F.2: The Fact Sheet (p. 3) quotes EPA's "Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria Lakes and Reservoirs in Nutrient Ecoregion XIV." That document, like the other EPA documents cited in the Fact Sheet, does not support the proposed limit. Nor does EPA present data that would permit applying that document in a scientifically defensible way.

As noted in the accompanying analysis by CDM, the document that EPA cites specifically states:

> EPA does not recommend identifying nutrient concentrations that must be met at all times; rather a seasonal or annual averaging period . . . is considered appropriate.

Far from supporting EPA's approach, this refutes the Fact Sheet's practice of basing calculations based upon 7Q10 flows. These flows are certainly not seasonal or annual averages. The Fact Sheet even considers times when the Attleboro WWTP's discharge (and that of the North Attleborough WWTP) account for all of the river's flow. Yet these flows are in fact the sole basis for setting a 0.1 mg/l limit (apart from the Rhode Island regulations, discussed below):

> **Given the lack of effective dilution under 7Q10 flow conditions**, a monthly average phosphorus effluent limit of 0.1 mg/l has been established to ensure that the Gold Book recommended value of 0.1 mg/l [sic] will not be exceeded in the Massachusetts reaches of the river below the discharge. [emphasis added]

Fact Sheet, p. 4, citing also the Nutrient Criteria Technical Guidance manual.

Under this reasoning, the plant's limit is the same as the limit for the river itself – which can only be true if one assumes that there is no dilution or attenuation at all. But EPA has acknowledged that "phosphorus" is "not completely retained in the water column" (Fact sheet, p. 5) and has acknowledged that the Attleboro WWTP discharges experience some dilution before reaching the Rhode Island border. See EPA Response #17 to North Attleborough Permit Comments, p. 16, attached as Exhibit 2 to this letter[18] See also USGS, Map attached as Exhibit 4.

On that basis, it initially proposed to reject RIDEM's argument for the 0.1 mg/l phosphorus limit. Id. Scientific studies show a substantial attenuation rate for phosphorus in streams. See excerpts from USGS "Sparrow" report entitled "Estimation of Total Nitrogen and Phosphorus in New England Streams Using Spatially Referenced Regression Models," excerpts attached as Exhibit F.[19] See also CDM Comments. The present change in position is, surprisingly, not supported with any rationale for ignoring or downplaying this attenuation factor.

Moreover, in referring to the Nutrient Criteria Technical Guidance Manual, EPA's Fact Sheet provides nothing to support its cryptic reference to "adjustments" that may have been "made to account for the differing flow assumptions used to determine those values (i.e. 7Q10 versus 2 or 3-month summer seasonal flows)." The cited literature does, indeed confirm that use of the 7Q10 values are not recommended. Yet, EPA relies upon such values anyway. Why it then refers to adjustments (presumably judgmental) to the 7Q10 values to produce seasonal numbers – which it apparently should have used in the first place – is a mystery, but it is not appropriate or scientifically justified. As such, it is speculative, arbitrary and capricious and contrary to law.

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[18] The RIDEM 2004 evaluation, p. 19 (previously submitted), states that "[]n the Ten Mile river, the DIN discharge to the Seekonk River was found to be 61% of the concurrent load estimate from the Attleborough and North Attleborough WWTFs using 1995-1996 flows.

[19] By reference, these comments also incorporate the entire Sparrow Report, at the URL reflected in Exhibit F.

Response #F.2: In developing the proposed effluent limitations for total phosphorus, dilution and background were considered, but calculations were not shown in the revised fact sheet. Because the dilution factor under 7Q10 conditions is low (1.4) and the background concentration is expected to be high (the average summer background concentration is approximately 100 ug/l based on the data collected at Station TM13 for the 2002 MA Water Quality Assessment), EPA determined that for purposes of the revised draft permit it was reasonable to assume that these factors offset each other and the limit should be equal to the criteria. The calculation of the limit is shown below:

$Cd = (CrQr-CsQs)/Qd$

Where Cd = concentration of the discharge (i.e. effluent limitation)

Cr = downstream concentration-100 ug/l

Qr= downstream flow - Qd +QS = 5.53 cfs + 13.3 cfs = 18.83 cfs

Qs = flow upstream of the discharge- 7Q10 = 5.53 cfs

Cs = background concentration = 100 ug/l

Qd = discharge flow = 13.3 cfs

Cd = [(100 ug/l)(18.83 cfs)-(100ug/l)(5.53)]/13.3 cfs

Cd = 100 ug/l

This equation is used to calculate the effluent limit necessary to achieve a desired in-stream concentration, which is in part dependent on assumptions regarding background concentrations and flow. For example, if the background concentration were assumed to be zero and the desired in-stream concentration were 100 ug/l, the effluent limit would be 142 ug/l. EPA believes that the proposed limit of 100 ug/l is appropriate given EPA's knowledge of currently prevailing background conditions, the uncertainty of accurately projecting the extent of reduced background concentrations in the near term future, and the existing cultural eutrophication in the receiving waters. The Ten Mile River and its impoundments are already highly laden with phosphorus due to the past discharges from the North Attleborough WWTF, Attleboro WPCF and other sources. EPA believes that it is prudent to adopt a reasonably conservative approach in aquatic systems where the cycle of cultural eutrophication is already underway, as is the case in the Ten Mile River. In order for the river to be restored to health, the eutrophic cycle must be broken by limiting the amount of excessive phosphorus available for uptake by aquatic plants and to allow whatever existing phosphorus has accumulated in the sediments in the past to gradually flush out of the system over time.

EPA does not believe a 0.1 mg/l that is calculated using seasonal average flows would be sufficiently protective to ensure compliance with applicable water quality standards. Massachusetts and Rhode Island water quality standards are required to be met under 7Q10 conditions, and EPA therefore used this dilution flow for the purposes of deriving the limit. During the growing season, when light and temperature are optimal for plant growth and the receiving water is subject to elevated nutrients concentrations, aquatic plant biomass growth can proliferate in relatively short periods of time. A permit limit of 0.1 mg/l calculated using seasonal flows would have the potential to allow periods of excessive loading of nutrients during and around critical low flow conditions while still meeting the overall limit. The resulting biomass from any plant growth would violate water quality standards and have the potential to settle into the sediments and contribute to future water quality violations. It is imperative, therefore, to ensure that phosphorus effluent discharges from the Attleboro WWTF and the resulting ambient phosphorus concentrations are maintained at consistently low levels. A phosphorus effluent limit that assumes worst case hydrological conditions will accomplish the objective of maintaining consistently low phosphorus in-stream concentrations.

In terms of compliance, EPA imposes the limit as a monthly average. Not only is imposition of a 30-day average limit consistent with federal regulations governing the NPDES programs,[20] such an averaging period will again reasonably minimize (when compared to a seasonal average limit) the amount of time that phosphorus effluent concentrations from the facility can exceed 0.1 mg/l and still comply with the limit. This approach maintains consistently low phosphorus effluent concentrations, as well as minimizes overall phosphorus loading, into the system, which is important in impaired waters, like the Ten Mile River, which are already suffering from severe existing cultural eutrophication and where there may be some potential for the existing sediment phosphorus deposits to recycle in the water column. As mentioned above, a relatively conservative approach is warranted in order for the eutrophic cycle to be brought to a halt, which is achieved by consistently maintaining low phosphorus concentrations and loads into the system. EPA believes a conservative approach is appropriate consistent with its obligation to ensure compliance with water quality standards.

It should be noted that EPA does not foreclose the imposition of seasonally-based limits in all instances so long as such limits are *sufficiently low* to ensure compliance with water quality standards. Based on EPA's review of seasonally-based ambient phosphorus values that were available in EPA's nutrient technical guidance and the peer-reviewed literature, it is clear that 0.1 mg/l imposed on a seasonal average basis would not be sufficiently stringent to meet this test. On

[20] *See* 40 C.F.R. § 122.45(d)(2) ("For continuous discharges all permit effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as average weekly and average monthly discharge limitations for POTWs.").

the other hand, the 0.1 mg/l limit as expressed in the permit falls within the range of the seasonally-based ambient phosphorus values in the record.

Specifically, EPA has conducted analysis, shown on Attachments 7A through 7C, in which we estimate the concentration of total phosphorus immediately downstream of the Attleboro discharge under various summer flow scenarios to address whether a 0.1 mg/l limit based on 7Q10 conditions will also meet the recommended ecoregional phosphorus criterion and values contained in Nutrient Criteria Technical Guidance Manual and the peer-reviewed literature, which were expressed as seasonal averages. Analyses were done using the design flow of the Attleboro treatment plant of 8.6 MGD, which is the condition required by NPDES permit regulations and also at actual flows to determine what water quality results might be achieved if neither Attleboro nor North Attleborough significantly increase their discharge flows. Under design flow conditions, the calculated in-stream concentrations are greater, since the dilution factors are reduced.

Although the background concentration of total phosphorus upstream of Attleboro averaged about 0.1 mg/l in the 2002 DEP data, this value was not used for the analysis since the resulting in-stream concentration, calculated using the proposed effluent limitation of 0.1 mg/l would always be 0.1 mg/l, and we expect there will be an improvement in background concentration over the longer term after North Attleborough has achieved its 0.1 mg/l total phosphorus limit and the upstream waterbodies become less euthrophic. We have used 0.03 mg/l as the background concentration because this was the average concentration measured in the Sevenmile River during the 2002 sampling (see Attachment 8), which was the lowest average measured concentration of any of the major tributaries monitored in 2002, and indicative of a concentration possibly achievable in the future.

The resulting calculations show that under 7Q10 conditions, with background at 0.03 mg/l and Attleboro discharging a total phosphorus concentration of 0.1 mg/l at current flow, the in-stream concentration just downstream of the Attleboro discharge would be about 0.059 mg/l, the low summer month average would be about 0.047 mg/l and the average summer concentration would be 0.043 mg/l. These values fall within the range of criteria recommended in the Nutrient Criteria Technical Guidance Manual (see Table 1 above) and begin to approach the ecoregion-recommended value of 24 ug/l. Under design flow conditions the corresponding in-stream concentrations would be about 0.070 mg/l under 7Q10 conditions, 0.057 mg/l under low summer average flow conditions and 0.052 mg/l under average summer conditions. These projected values fall higher in the range of guidance and literatures values cited above.

EPA disagrees with the commenter's view that downstream dilution justifies a less stringent limit. The Sevenmile River joins the Ten Mile River downstream of the Attleboro discharge. Data collected by MassDEP in 2002 show that the Sevenmile (the source of Attleboro's drinking water) has a much lower phosphorus concentration than the Ten Mile (see Attachment 5), and could theoretically serve to dilute the phosphorus concentrations in the Ten Mile.

However, as can be seen by the data, the phosphorus concentration at TM14, which is downstream of both the confluence with the Sevenmile River and the Attleboro discharge, shows approximately the same concentration as TM 13, the station above Attleboro. This indicates an increase in the phosphorus load due to the Attleboro WPCF discharge that offsets any dilutive effect from the Sevenmile River flow. The observed concentrations of total phosphorus at TM14, which range from 0.11 mg/l to 0.2 mg/l, far exceed the recommended phosphorus criteria and values which have been previously cited for free flowing streams and the numeric criteria for the downstream lakes.

EPA is also not persuaded that attenuation would justify removal of the phosphorus limit. In general, much of the phosphorus removed by in-stream physical and biological processes is not permanently removed from the environment, but rather settles to the bottom where it is available for further biological growth, or is subsequently transported to downstream impoundments during high flow events. This is problematic given the severe degradation being experienced in downstream river segments and impoundments under existing conditions. In other words, EPA does not believe that attenuation by itself counsels in favor of removing or imposing less stringent limits. Instead, an appraisal of downstream conditions is necessary before deciding such a change is appropriate and consistent with EPA's duty to ensure compliance with all applicable water quality standards.

As to the amount of attenuation that is actually occurring, the 2002 monitoring data indicate that loads from the North Attleborough and Attleboro treatment plants are reduced as they flow downstream. Attachment 9 shows calculations of total phosphorus loads using the 2002 MassDEP sampling data for in-stream phosphorus concentrations, treatment plant data from discharge monitoring reports for total phosphorus concentrations and daily flow, and estimated stream flows using the daily flow data from the East Providence gage, adjusted for treatment plant flow and apportioned by watershed area. These admittedly rough estimates show that during low flow conditions, the sum of the loads from upstream of the Attleboro facility, plus the Attleboro WPCF load, plus the Sevenmile load, exceed the loading estimated at the downstream sampling station, sometimes by a significant amount. *See* calculations on bottom row of Attachment 9. However, when the spring sampling event is included, there is only about 10 percent attenuation of the phosphorus load. Because phosphorus loading from the City will not be attenuated by in-stream eutrophic processes under future conditions to the same extent they are today as the cultural eutrophication process is addressed through the imposition of more stringent phosphorus controls on discharges to the Ten Mile River, EPA does not believe it is appropriate or reasonable to assume the continuation of existing summer attenuation rates when calculating a permit limit. Even if there is a small attenuation of phosphorus downstream of the discharge under future conditions, this will serve to help attain water quality criteria in Turner Reservoir, rather than justify an increased discharge from Attleboro

The commenter has referenced the Spatially Referenced Regression on Watershed Attributes (SPARROW) model that was developed by USGS in cooperation with USEPA and NEIWPCC as a tool to assist the regional TMDL and nutrient-criteria activities in New England. While EPA is familiar with the SPARROW model and recognizes its utility under certain circumstances, it prefers to rely on actual water quality data where it available (as it is here) in favor of a generic modeling tool. Still, SPARROW is unlikely to lead EPA to a different conclusion regarding attenuation and Attleboro's permit limit. The model uses regression equations to relate total nitrogen and phosphorus stream loads to nutrient sources and watershed characteristics. The model output includes mean annual predictions of nutrient concentration and loads. The equations include a factor that accounts for in-stream loss of phosphorus. As described in the USGS paper, "although there are a variety of chemical, biological and physical processes that contribute to in-stream loss of nutrients, the SPARROW models do not attempt to distinguish or identify individual nutrient loss processes because adequately detailed information on these processes is generally not available." *Estimation of Total Nitrogen and Phosphorus in New England Stream Using Spatially Referenced Regression Models*, at p. 5. Because of the non site-specific method used to estimate the in-stream reductions, we believe that they should be used with caution in applying them to a particular stream and should not be used where there are monitoring data. Nonetheless, we would expect the reduction predicted by the model for the segment between the Attleboro discharge and the entrance to Central Pond to be small. The annual mean loss factor used in the model for small streams is expressed as $e^{-0.48d-1}$, meaning that the half life (the time it takes to reduce the load by half) is about one and a half days. Given the short distance between the Attleboro discharge and the entrance to Central Pond (about three miles), a travel time much less than this would be expected.

It is unclear what point the commenter is trying to make in the footnote referencing current nitrogen attenuation rates in the Ten Mile River. As addressed in previous responses, the current levels of nitrogen attenuation reflect uptake by the excessive aquatic plant growth in the Ten Mile River that is driven by the high levels of phosphorus.

Comment #F.3: The problem is compounded by the fact that EPA previously cited the same Gold Book and its Ecoregional Nutrient Criteria, which support in-stream phosphorus concentrations up to 0.24 mg/l – consistent with the MassDEP highest and best practicable treatment of 0.2 mg/l – in justifying the original 0.2 mg/l limit for the North Attleborough plant, and the Attleboro WWTP. North Attleborough Response to Comments, p. 5. To use the same data to support two significantly different conclusions, to the detriment of the City, is again arbitrary and capricious.

Response #F.3: Presumably the commenter is referring to Response #4 of the North Attleborough Response to Comments. In the response, EPA inadvertently referred to the eco-regional criteria as 0.24 mg/l instead of the correct value of 0.024 mg/l. The Fact Sheet contained the correct value of 0.024 mg/l.

Similar to Attleboro, EPA has recognized that the North Attleborough limit of 0.2 mg/l is insufficient to ensure that the Gold Book criteria of 100 ug/l will be met immediately downstream of the discharge and that the Rhode Island criteria of 25 ug/l for Turner Reservoir will be met and has issued a final permit modification with a discharge limit of 0.1 mg/l.

Comment #F.4: Nor do the EPA Criteria Recommendations set forth 24 ug/l "for this ecoregion" as a whole (see Fact Sheet, p. 3); that number applies only to certain types of water bodies. Applying the number to a river, without considering whether a WWTP discharge causes the impoundment itself to exceed applicable limits (or whether the impoundment is really a pond at all), contravenes the source document. None of the new analysis is faithful to the words or intent of the cited EPA documents, which, properly read, do not support the proposed 0.1 mg/l monthly limit.

Response #F.4: See response above explaining the role of the reference-based eco-region criteria recommendations in establishing the final permit limit for phosphorus and EPA's decision to opt for an effects-based approach. The applicability of water quality criteria to manmade bodies of water like Turner Reservoir is discussed in Response #F.6 below.

It is not clear what the commenter is referring to relative to the applicability of the ecoregional recommendations and why it concludes that EPA's use of the criteria in this context is inconsistent with the "source document." The in-stream recommended criteria of 24 ug/l clearly applies to rivers and streams in sub-ecoregion 59, which includes eastern Massachusetts and all of Rhode Island. EPA considered these criteria when assessing the overall reasonableness and protectiveness of the permit's phosphorus limit. The applicability of in-stream criteria is independent of pollutant sources and current water quality conditions.

Comment #F.5: Even RIDEM urged EPA to adopt a waste load allocation approach (with a margin of safety). See RIDEM Comments, dated September 12, 2006, on North Attleborough and Attleboro draft permits, p. 3, attached as Exhibit 3 ("the limits **must** be revised using a Waste Load Allocation strategy . . .."). Adopting a dilution approach is no substitute; RIDEM's regulations (incorporating notions of causation and average values, as discussed below) cannot be applied without doing the work required by the allocation approach. To do valid waste load allocations requires identifying the other contributing sources of phosphorus; otherwise, one use may be overregulated and others ignored or under-regulated. See accompanying CDM comments. For instance, in Arkansas, 503 U.S. at 108, the Supreme Court cited the Clean Water Act's "provisions designed to remedy existing water quality violations and to allocate the burden of reducing undesirable discharges between existing sources and new sources. See, e.g. § 1313(d)." There is no way to allocate burdens rationally without first identifying all sources, calculating the load capacity of the receiving body and then determining which discharges merit allocations of particular loadings in the

context of the "Reservoir's" watershed. The very concept of a "waste load allocation," referenced in RIDEM's comments, requires as much.

Likewise, in Friends & Fishers, 446 Mass. at 840-841, the court relied upon a "comprehensive" and "studied analysis of various sources' contributions of nitrogen to the recharge area and the watershed" -- a report of load growth scenarios and contributions of various sources to the Pond's nutrients, funded by EPA under Section 604(b) of the Clear Water Act.[21] Based upon this 604(b) report and the applicable regulations (including applicable surface water regulations), the Court affirmed a groundwater discharge permit that allowed a wastewater treatment plant to contribute nitrogen to a Pond whose waters "are already stressed." Id. at 843-844. The Court noted the MassDEP Commissioner's observation that the antidegradation provision requires, among other things "nonpoint source controls to address eutrophication." Id at 843. There is no evidence that this level of analysis (or anything of equal scientific validity) has been done here, to justify severe limits upon phosphorus.

We know, for instance, that there are many other sources of nutrients in Turner Reservoir, not the least of which may be the numerous nearby golf courses. See Attachment 5 to this letter. Neither EPA nor RIDEM provides any studied analysis of sources of nutrients, load growth (or diminution[22]) scenarios or tolerance of the Turner Reservoir. There is, of course, no TMDL or other site-specific analysis of tolerable limits. Without studying the total context in which the Attleboro WWTP's discharge allegedly contributes to any alleged water quality violation, the 0.1 mg/l limit is speculative. There is no way to know whether imposing any particular limit will even have any effect at all, other than imposing costs upon Attleboro's tax and rate payers. The Fact Sheet does not begin to perform the serious task of waste load allocation for Turner Reservoir. Nor does it refer to any study that has done so. To impose speculative limits, based upon a RIDEM's request for a waste load allocation approach, without supporting data, is arbitrary and capricious. Congress never intended to permit such an approach; it mandated TMDLs and contemplated scientific studies as a basis for allocation decisions. See, e.g. 33 U.S.C. § 1313(d)(TMDL's); 33 U.S.C. § 1285(j) (604(b) water quality management planning grants); 40 C.F.R. 130.7 (calculation of TMDL).

Response #F.5: Rhode Island is not arguing that EPA assign specific loads to all point and nonpoint sources of phosphorus in the system *prior* to establishing a limit on the Attleboro facility.[23] Indeed, in arguing for the imposition of a phosphorus effluent limit at this time, Rhode Island (see comment # C.1) itself

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[21] See Exhibit 9 [Wilcox testimony regarding EPA program].

[22] EPA should study the declining phosphorus levels cited in its original Fact Sheet on the Attleboro and North Attleborough draft permits

[23] The absence of comments from Rhode Island on the 0.1 mg/l limit and the fact that Rhode Island regularly issues permits for listed waters in the absence of TMDLs would seem to be confirmation of this.

relied on dilution-based calculations of in-stream concentrations of pollutants at the Rhode Island/Massachusetts state line using an estimated 7Q10 and the proposed permit limits, and compared those in-stream concentrations with state numeric water quality criteria. In determining that the in-stream concentrations did not meet RI water quality standards, the state noted that the limits must be revised using a wasteload allocation strategy that would account for any lack of knowledge concerning the relationship between effluent limits and water quality, that ensures an equitable distribution of pollutant loads and that at a minimum meets all Rhode Island water quality criteria. Although EPA does not to refer to its development of an NPDES permit effluent limit for phosphorus as a "waste load allocation strategy," in establishing the permit limit EPA has accounted for background sources of phosphorus through the use of ambient monitoring data, factored in uncertainty between the imposition of an effluent limit and water quality by adopting a reasonably conservative approach (*i.e.*, use of 7Q10 dilution flow), and applied the effluent limit to the two major point source dischargers of pollutants in the Ten Mile River (*i.e.*, North Attleborough and Attlelboro facilities). EPA also notes that in the line preceding the sentence fragment quoted above by the commenter, RIDEM states, "As you know, pursuant to the NPDES regulations at 40 CFR 122.44(d) and 33 U.S.C. Sec. 1341 (a)(2), NPDES limits must achieve compliance with water quality standards and *limits must be included in permits where pollutants will cause, have reasonable potential to cause, or contribute to an exceedance of the State's water quality.*" (emphasis added). EPA agrees.

Even if Rhode Island were advocating that EPA delay imposition of the phosphorus limit until a TMDL or its equivalent is completed, EPA would not be required to do so under the CWA or implementing regulations. EPA is not prohibited from imposing water quality-based permit limits on mixed water bodies (*i.e.,* those impaired through a combination of point and nonpoint sources) in the absence of a TMDL. While the commenter is correct that such waters must be identified on a 303(d) list and TMDLs established to implement applicable water quality standards according to a priority ranking, nothing in Section 303(d), EPA regulations, or the cases cited above suggests that EPA must do the work of a TMDL (*i.e.*, allocate loads to the point and nonpoint pollutant sources contributing to the impairment) prior to imposing a water quality-based effluent limit.

When issuing an NPDES permit, the operative sections of the CWA and regulations remain sections 301, 402 and 40 C.F.R. §§ 122.4 and 122.44(d)(1). When determining whether a reasonable potential exists for a pollutant to cause or contribute to water quality violation, 40 C.F.R. § 122.44(d)(1)(ii) directs EPA to account for, among other factors, "*existing* [emphasis added] controls on point and nonpoint sources of pollution" and authorizes it consider dilution where appropriate. EPA has done that in this case. If EPA determines that there is a reasonable potential to contribute to a water quality violation under this section, EPA is then obligated to impose a water quality-based effluent limit under 40 C.F.R. § 122.44(d)(1)(iii). This limit must be "consistent with the assumptions

and requirements of any *available* [emphasis added] wasteload allocation prepared by the State and approved by EPA pursuant to 130.7." Thus, NPDES regulations provide an adequate mechanism for EPA to factor in existing pollutant controls and existing waste load allocations prior to imposing water quality-based limits. EPA's decision to issue a permit in the absence of a TMDL or equivalent study is reasonable in light of these regulations, which clearly do not require EPA to conduct the type of comprehensive allocation of loads among all sources of pollutants before imposing such a limit. Future TMDLs, planned by both MassDEP and RIDEM, will further help in targeting other point source and non-point source reductions. (To the extent such other sources are related to storm water, they would likely not affect the need for stringent controls on continuous discharges of wastewater which will occur during periods of critical low flow).

Contrary to the City's claim, EPA's phosphorus effluent limit is not speculative, but is based upon actual ambient data from the receiving water, is grounded in EPA guidance and peer-reviewed technical literature, and is intended to address an undisputed and serious water quality impairment. Based on the discussion in the Fact Sheet and this Response to Comments, it is clear that the receiving water is severely impaired for nutrients, that phosphorus effluent discharges from the Attleboro discharge have the reasonable potential to cause or contribute to exceedances of both Massachusetts and Rhode Island water quality standards, and the proposed limit is necessary to achieve those standards.

Comment #F.6: The new Fact Sheet cites Rhode Island regulations. Even applying the Rhode Island standard, the proposed 0.1 mg/l phosphorus standard is excessively stringent.

The relevant Rhode Island rule reads:

> **Average** Total Phosphorus shall not exceed 0.025 mg/l in any **lake, pond, kettlehole or reservoir**, and **average** Total P in tributaries at the point where they enter such bodies of water shall not **cause exceedance** of this phosphorus criteria [sic], **except as naturally occurs**, unless the Director determines on a site specific basis, that a different value for phosphorus is necessary to prevent cultural eutrophication.

Table 1.8D.(2)[emphasis added].

The draft justification for the 0.1 mg/l limit falls well short in many ways, particularly when compared to each word or phrase of the regulation highlighted in bold above:

- Neither the evidence, nor the proposed limit, deal with "average" values over the applicable time period. The limit deals with a monthly figure, when seasonal values are appropriate; it imposes a number based upon the discharge point and the discharge of the tributary into Turner Pond